INTEX-NA Flight 8: July 15, 2004 (Transit flight)

This was a transit flight from MidAmerica to Portsmouth (Pease AFB) which also incorporated several science objectives. Salient among the latter were validation of Terra (MOPITT, MISR) and Aqua (AIRS, MODIS) instruments, validation of FTS CO2 column measurements at Park Falls, CO2 inter-comparison with the NSF King Air (COBRA) aircraft, characterization of Asian pollution, Alaskan fires, and anthropogenic pollution. The flight was guided by meteorological analysis and forecasts from multiple models. Total flight duration was 7.5 hours with a nominal 8:00 am takeoff. Basic flight patterns and there location are shown in the slides below. A portion of the eastern leg of the flight plan (beyond PT 15) was greatly altered during due to deteriorating weather conditions.

The major flow feature at the surface was a middle latitude wave cyclone located near Buffalo, New York. This system was quite intense for mid July, with a central pressure near 1000 mb. The cold front associated with the low passed through the New England states and into the Atlantic. A wide area of clouds and precipitation was located in advance of the front and near the low's center, and a large cloud area extended west of the low. These clouds blanketed the eastern leg of the flight track. The flow in the middle and upper troposphere was highly amplified for July. A strong closed low or trough was located along the Atlantic Coast. Conversely, a strong ridge was oriented along the Rocky Mountains. The jet stream was strong and extended far into the South. A minor short wave trough was located east of the ridge line, traveling southeast near Minnesota. This trough was producing increasing cloudiness over the western part of the flight area. Thus, the first spiral over northern Wisconsin was almost cloud free, while the second spiral contained scattered clouds.

We flew North from MidAmerica and encountered upper level (29, 000 ft) pollution with ozone levels >100 ppb that may represent the Asian outflow predicted by models. Formaldehyde concentrations as high as 1 ppb were observed but surprisingly SO2, a typical component of Asian pollution, was quite low. At 1415 UT, we did a spiral (33000-500 ft) over Park Falls centered on the tall towers under essentially cloud free conditions. This spiral occurred concurrently with the COBRA King Air to accomplish a planned CO2 inter-comparison. A CO2 drawdown of 2.5% was observed by the DC-8. The DC-8 flew north to sample Alaskan fires over Canada but the no significant Alaskan fires influences were encountered up to 53N. We did a second spiral over Point Falls at 1720 UT to coincide with a Terra overpass and also to observe any diurnal changes in the CO2 draw-down and its atmospheric column. This Terra spiral occurred under relatively clear conditions but some scattered clouds were present. An attempt to validate AIRS instrument aboard Aqua at 1845 UT was aborted due to excessive cloudiness in the region. Mixed stratospheric/tropospheric air (O3>100 ppb; CO<100 ppb) was sampled at around 35000 ft on the eastern leg. A breakaway Alaskan fire plume was sampled at 25000 ft on the eastern leg of the flight (CO>200 ppb; mostly nonvolatile aerosol). A low pressure system resulting in deteriorating weather conditions after PT 15 resulted in several deviations to the flight plan prior to arrival at Pease. Overall, this was a successful transit flight that was also able to accomplish several science objectives

The navigational data are available at URL: http://www.dfrc.nasa.gov/Research/AirSci/DC-8/ICATS/index.html

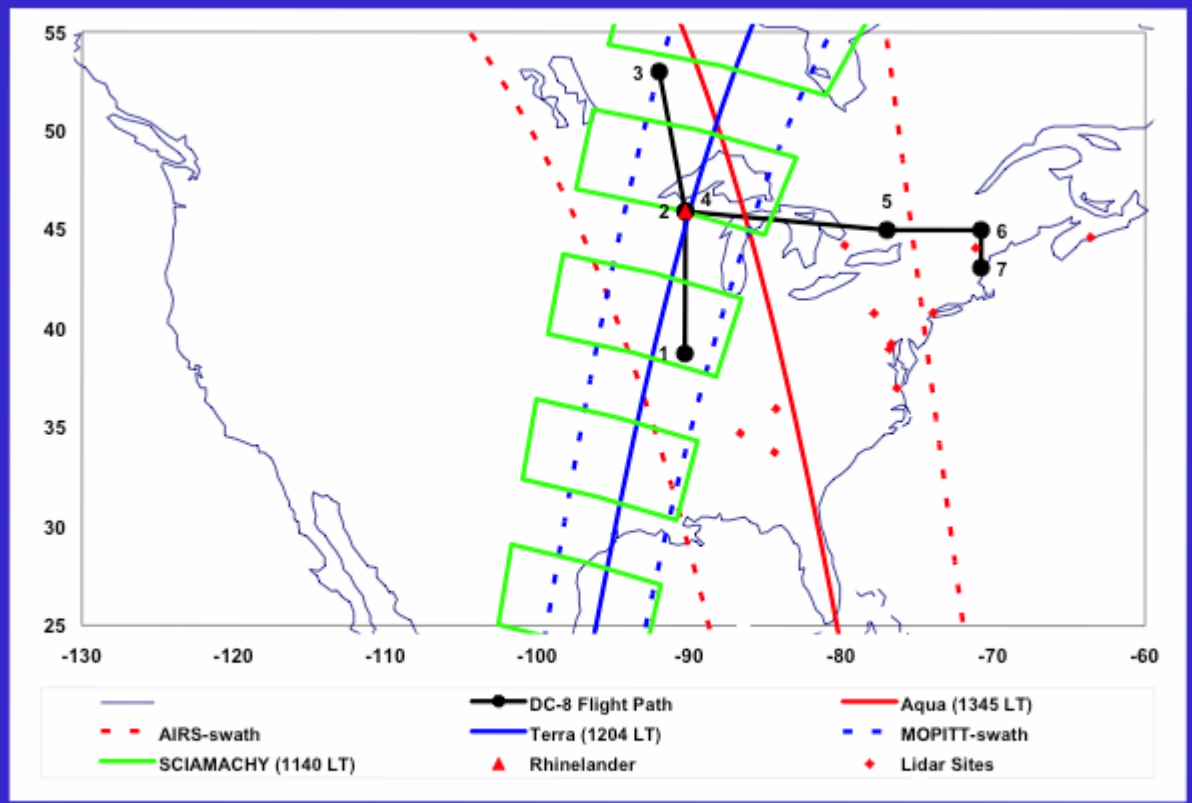
Take off:
8 am

Flight time:
7.5 hours

Point	Latitude	Longitude	
1	38.75	-90.3	Takeoff at 0800 local
2	45.94	-90.27	spiral (hard timing)
3	53	-92	
4	45.94	-90.27	spiral (if clear)
5	45	-77	spiral at ~1345
6	45	-70.8	
7	43.1	-70.8	

INTEX Flight #8 Plan – MidAmerica-Pease Transit on 7/15

plan last updated 7/13 @15Z



Objectives: High altitude Asian influence (leg 1-2), boundary layer emissions from Alaskan fires (leg 2-3), wraparound low containing lifted pollution and stratospheric air (leg 5-6), intercomparison with COBRA (pt. 2), Terra underflight (pt. 4), and Aqua underflight (leg 4-5).

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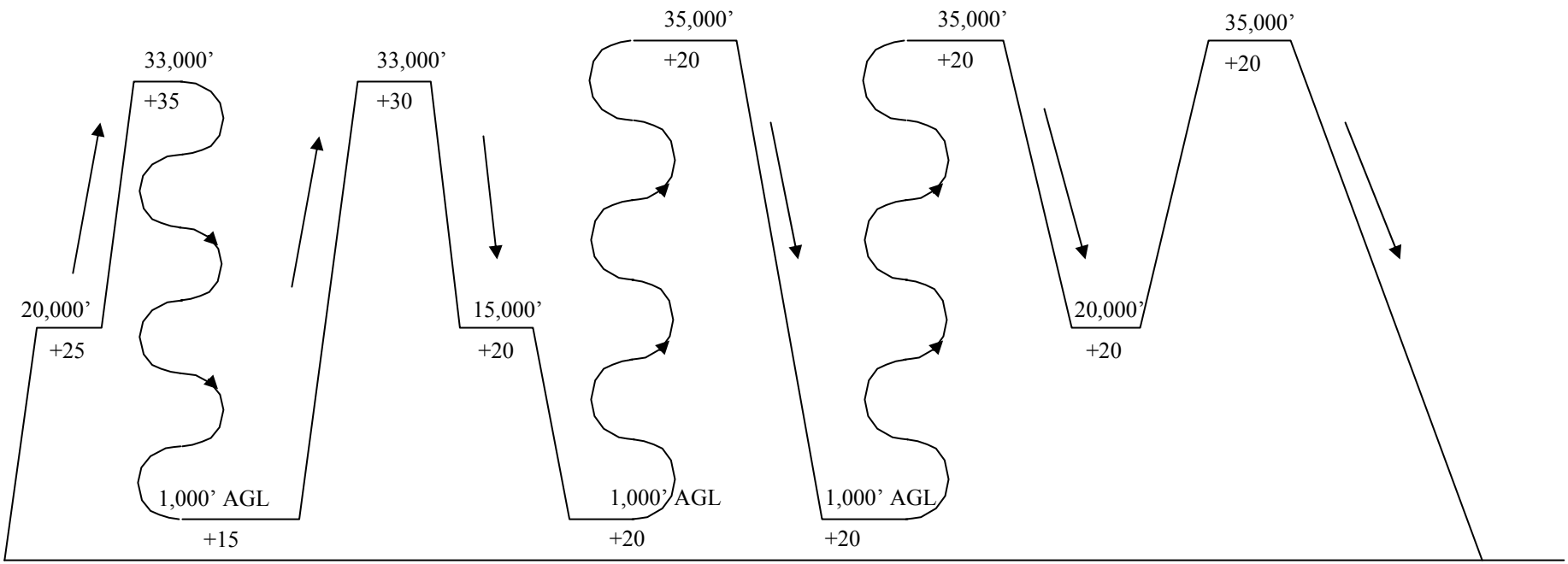
SPIRAL DESCENTS/CLIMBS

@ 1500 FPM

BOTTOM 10,000 @ 1,000FPM

ALL ENROUTE
CLIMBS/DESCENTS
@ 1500 FPM



BLV PT5 PT6 PT9 PT10 PT13 PT14 PT16 PT17 PT19 PT20 PSM

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TYPE ACFT	CALL SIGN	DATE	FROM	TO	PLND TO	ACT TO	PILOT	COPILOT
DC-8	NASA817		SCOTT AFB MID N 38 32.7 W089 50.1	PEASE INTL TR N 43 04.7 W070 49.4	13:07			

TOT DIST	TOT TIME	FUEL REQ	NAVIGATOR	ENGINEER
2258.1	07+23	76155		

TP DTD#	Fix/Point Description	FREQ	Latitude Longitude	Alt Wind	TAS GS	TC MC	LEG DIST DIST REM	LEG TIME TIME REM	ETA	RETA	ATA	REMARKS
1	KBLV/A SCOTT AFB MID		N 38 32.7 W089 50.1	459M		136 137	5.0 2253	00+02 07+21	13:07			
2	CAP/R CAPITAL	074X 112.70	N 39 53.5 W089 37.5	20000M	420 420	004 005	84.6 2169	00+14 07+07	13:23			
3	BDF/R BRADFORD	094X 114.70	N 41 09.6 W089 35.3	20000M	420 420	001 002	76.0 2093	00+11 06+56	13:34			
4	MSN/R MADISON	023X 108.60	N 43 08.7 W089 20.4	33000M	420 420	005 007	119.6 1973	00+17 06+39	13:51			
5	.TOWER IWD/R189036	025X 108.80	N 45 56.8 W090 16.3	33000M	420 420	347 348	172.8 1800	00+25 06+15	14:16			SPIRAL DOWN CIRCLE TOWER
	.delay	025X 108.80	N 45 56.8 W090 16.3	33000M	420 420	347 348	0.0 1800	00+30 05+45	14:46			
6	.PT 06 IWD/R330032	025X 108.80	N 47 00.0 W090 30.0	20000M	N/A N/A	351 353	63.9 1736	00+09 05+35	14:55			
7	.CZWG FIR YQT/R261054	088X 114.10	N 48 05.5 W090 45.5	20000M	330 330	351 353	66.4 1670	00+12 05+23	15:07			CZWG FIR
8	.PT 08 YRL/E089086	087X 114.00	N 51 00.0 W091 30.0	20000M	330 330	351 352	177.0 1493	00+32 04+51	15:39			
9	.PT09 ZRJ/N280025	236.00	N 53 00.0 W092 00.0	20000M	330 330	351 353	121.6 1371	00+22 04+29	16:01			
10	.PT10 YRL/E089086	087X 114.00	N 51 00.0 W091 30.0	20000M	330 330	171 173	121.6 1250	00+22 04+07	16:24			
11	.KZMP FIR YQT/R275055	088X 114.10	N 48 18.5 W090 49.0	20000M	330 330	171 172	163.8 1086	00+30 03+37	16:53			KZMP FIR
12	.PT12 IWD/R330032	025X 108.80	N 47 00.0 W090 30.0	20000M	330 330	171 172	79.6 1006	00+14 03+23	17:08			
13	.TOWER IWD/R189036	025X 108.80	N 45 56.8 W090 16.3	20000M	330 330	171 173	63.9 942	00+12 03+11	17:19			SPIRAL UP?

TP DTD#	Fix/Point Description	FREQ	Latitude Longitude	Alt Wind	TAS GS	TC MC	LEG DIST DIST REM	LEG TIME TIME REM	ETA	RETA	ATA	REMARKS
14	DRM/N DRUMMOND ISLA	218.00	N 46 00.4 W083 44.5	20000M	330 330	089 094	273.2 669	00+50 02+21	18:09			
15	.CZYZ FIR SSM/E131044	059X 112.20	N 45 58.0 W083 28.0	20000M	330 330	102 110	11.8 657	00+02 02+19	18:11			CZYZ FIR
16	D9/N HUNTSVILLE	383.00	N 45 21.3 W079 08.7	20000M	330 330	101 111	185.5 472	00+34 01+46	18:45			SPIRAL DOWN 1845 UNDERPASS
	.delay	383.00	N 45 21.3 W079 08.7	20000M	330 330	101 113	0.0 472	00+30 01+16	19:15			
17	YSH/N SMITHS FALLS	334.00	N 44 54.1 W076 00.6	20000M	330 330	102 114	135.9 336	00+25 +51	19:40			
18	.KZBW FIR MSS/R280030	088X 114.10	N 44 52.5 W075 26.0	20000M	330 330	094 108	24.7 311	00+04 +46	19:44			KZBW FIR
19	MS/N MISSE	278.00	N 44 51.2 W074 54.9	20000M	330 330	093 108	22.1 289	00+04 +42	19:48			
20	EFK/N NEWPORT	242.00	N 44 57.2 W072 10.6	20000M	330 330	087 102	116.9 172	00+21 +21	20:09			
21	RQM/N RANGELEY	221.00	N 44 56.1 W070 45.1	20000M	330 330	091 108	60.8 111	00+11 +10	20:21			
22	KPSM/A PEASE INTL TR		N 43 04.7 W070 49.4	100M		182 198	111.4 0	00+10 +00	20:31			

GEOS curtain plot